

Brüel & Kjær

Portable Stroboscope

Type 4912

Valid from serial no. 879442

037—0370



Service



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Trouble Shooting

If any faults should occur please check the instrument according to the Adjustment Procedure.

When a fault has been traced and corrected, the voltages and adjustments influenced by the correction must be rechecked. The complete instrument should then be tested to make sure that all basic functions are operative.

The tolerances given in these notes are intended for use as guide for adjustments.

Before correcting any apparent deviation make sure that the measuring instrument has tolerances small enough not to affect the measurement.

Modifications

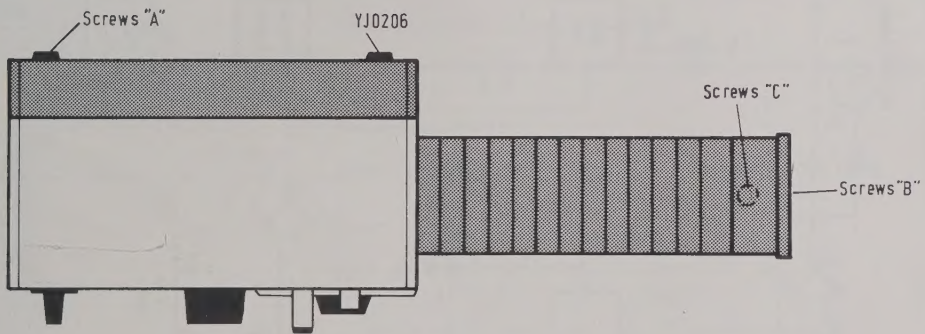
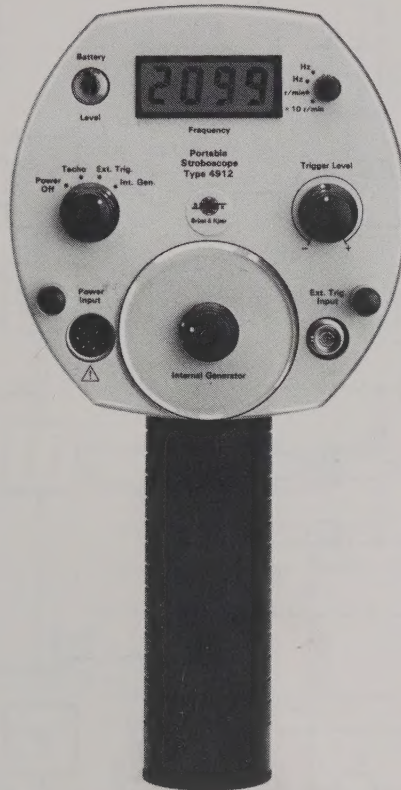
Due to the constant technical progress the instrument will be modified from time to time in order to provide continuously improved performance.

For this reason there may be small differences between the instrument and the Service Instruction.

However, the local Representative Service is in possession of all information regarding the modifications that have been made.

Spare Parts

Please state type and serial number of the instrument when ordering spare parts.



Battery Exchange

Remove YJ 0206, unscrew four screws "A" and remove the front glass. Unscrew two screws "B", pull off bottom of handle, and unscrew two screws "C". Now the batteries can be unsoldered one by one and exchanged. Three batteries in the handle and two in the lamp box.

Assembly in opposite order

Lamp Exchange

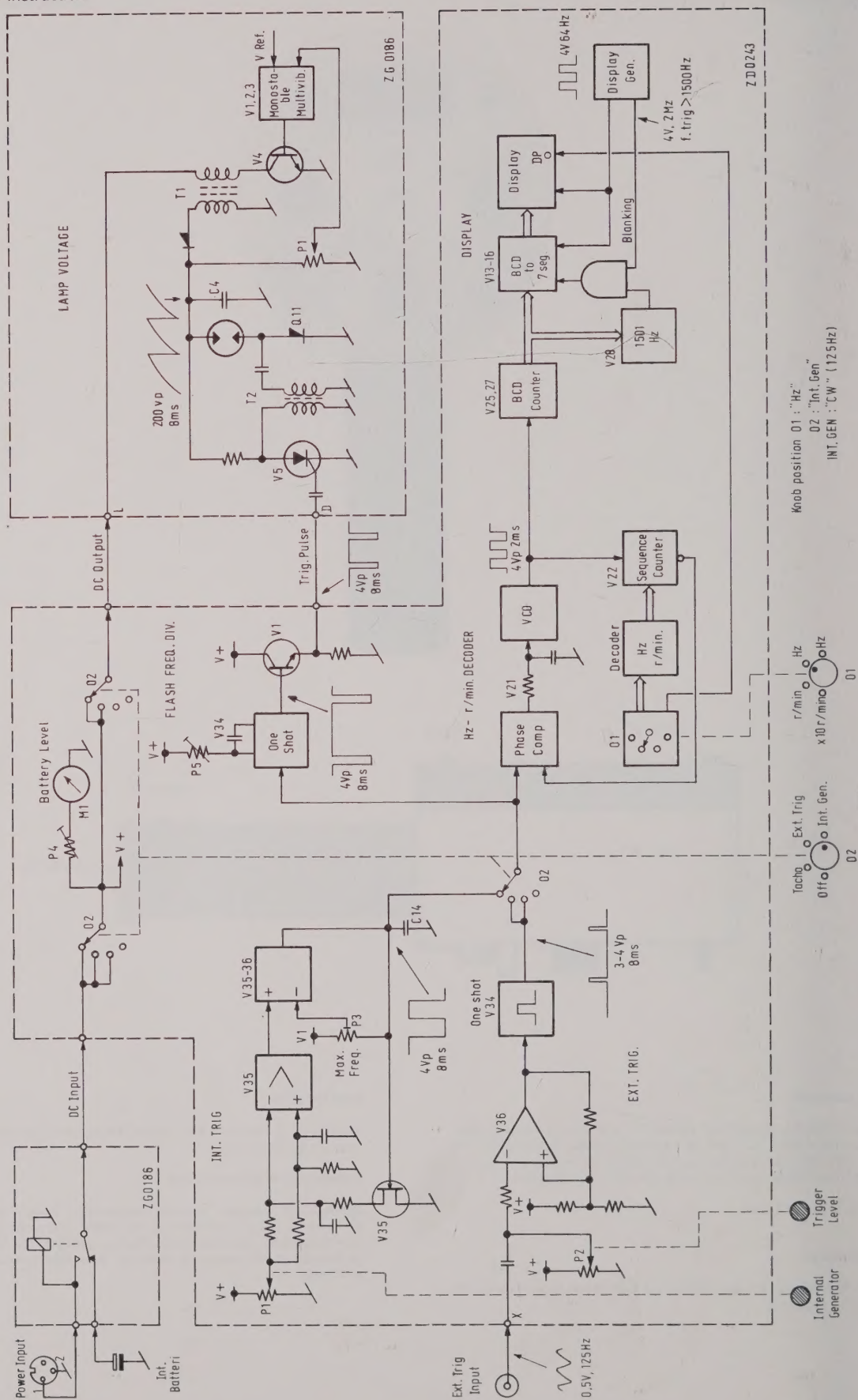
Remove four screws "A" and remove the front glass, lamp-reflector unit can then be pulled out.

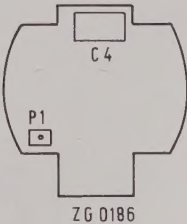
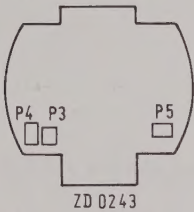
Fuse Exchange

Remove the 2 screws B and remove the bottom of the handle. Now the fuse can be exchanged.

Disassembly of Electronic Unit

Unscrew the knobs: "Internal Generator", "Trigger Level", "Power Off" and "Hz/rpm". Pull out four "YJ 0206" and unscrew screws "A", then lamp cover can be removed. The four hexagon "YG 0258" can then be unscrewed and whole unit taken out. Eventually pull out reflector unit with lamp.





- a. Battery Level
02: "Tacho"
01: "Hz"

Check that the meter deflects to a position between the red and the blue sector for an external voltage of 5,0 V DC on "Power Input" socket pin "1" and "2".

If necessary adjust P4

- b. Internal Trig.
02 to "Int. Gen."

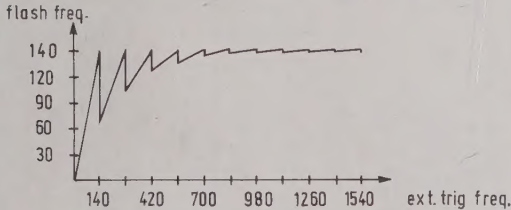
Turn "Internal Generator" fully CCW.

Check display: 3,5 (Hz) $\pm$ 3 Hz

Turn "Internal Generator" fully CW.

Check display: 125 (Hz) + 0,6 Hz, -0,2 Hz

If necessary adjust P3



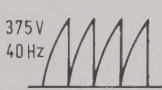
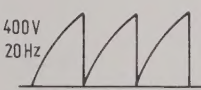
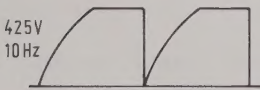
- c. Flash Frequency Dividing
02 to "Ext. Trig."

Input signal to "Ext. Trig. Input" 0,5 V, 5 Hz

Increase the trigger frequency and check that the frequency dividing takes place around 135 - 140 Hz.

If necessary adjust P5

Check the following dividing frequencies according to the above curve.



- d. Lamp Voltage

Input signal to "Ext. Trig. Input": 10 Hz, 0,5 V

Connect an oscilloscope ($\times 10$ probe) across C4 on ZG 0186 and measure the voltage: 425 Vp

If necessary adjust P1 on ZG 0186

Check also the lamp voltage at 20 and 40 Hz.

- e. Hz-r/min Decoder

Input signal to "Ext. Trig. Input": 125,0 Hz, 0,5 V

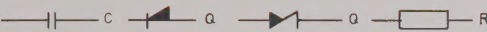
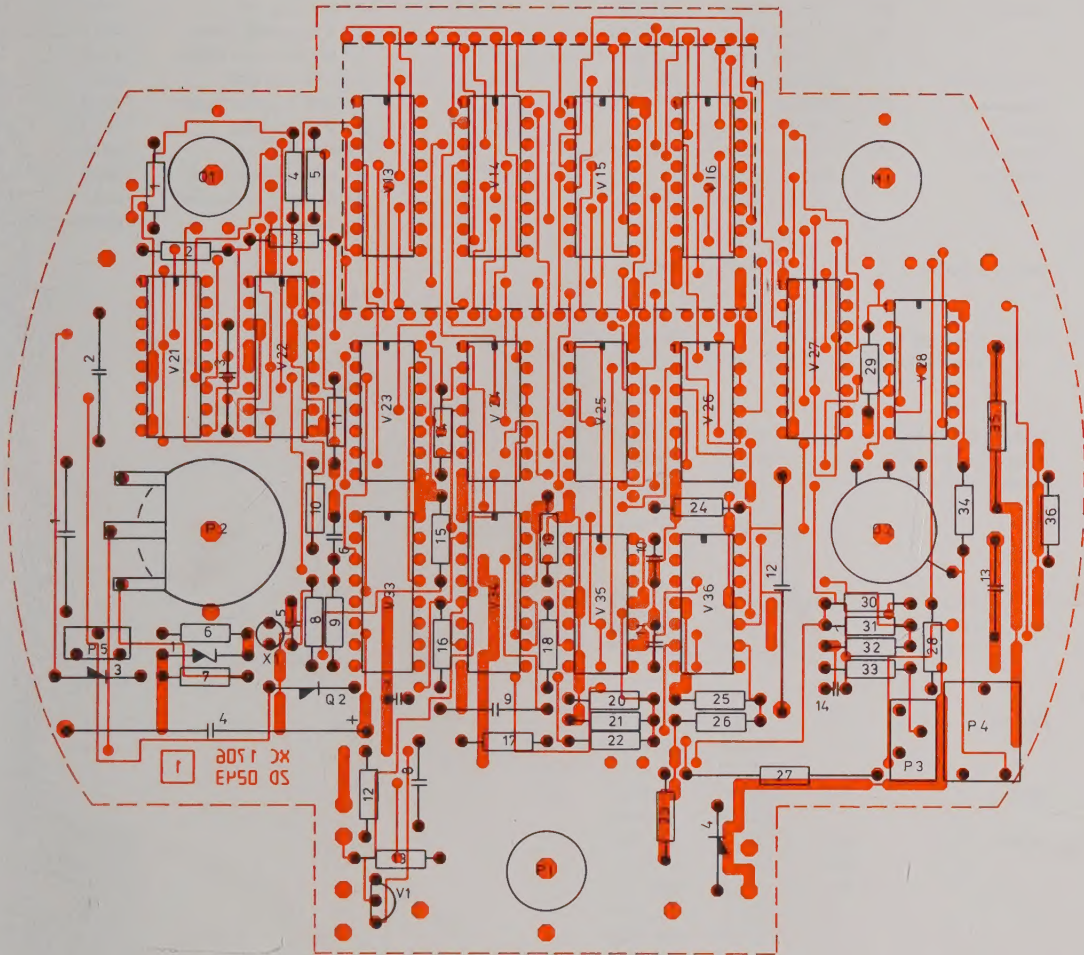
Check display according to below positions of 01.

01, "Hz":	125
01, "Hz":	125,0
01, "r/min":	75000
01, "x10 r/min":	750

- f. Display
01 to "Hz"

Input signal to "Ext. Trig. Input": 1000 Hz, 0,5 V

Slowly increase input frequency and observe that display starts flashing when the reading reaches "1500".

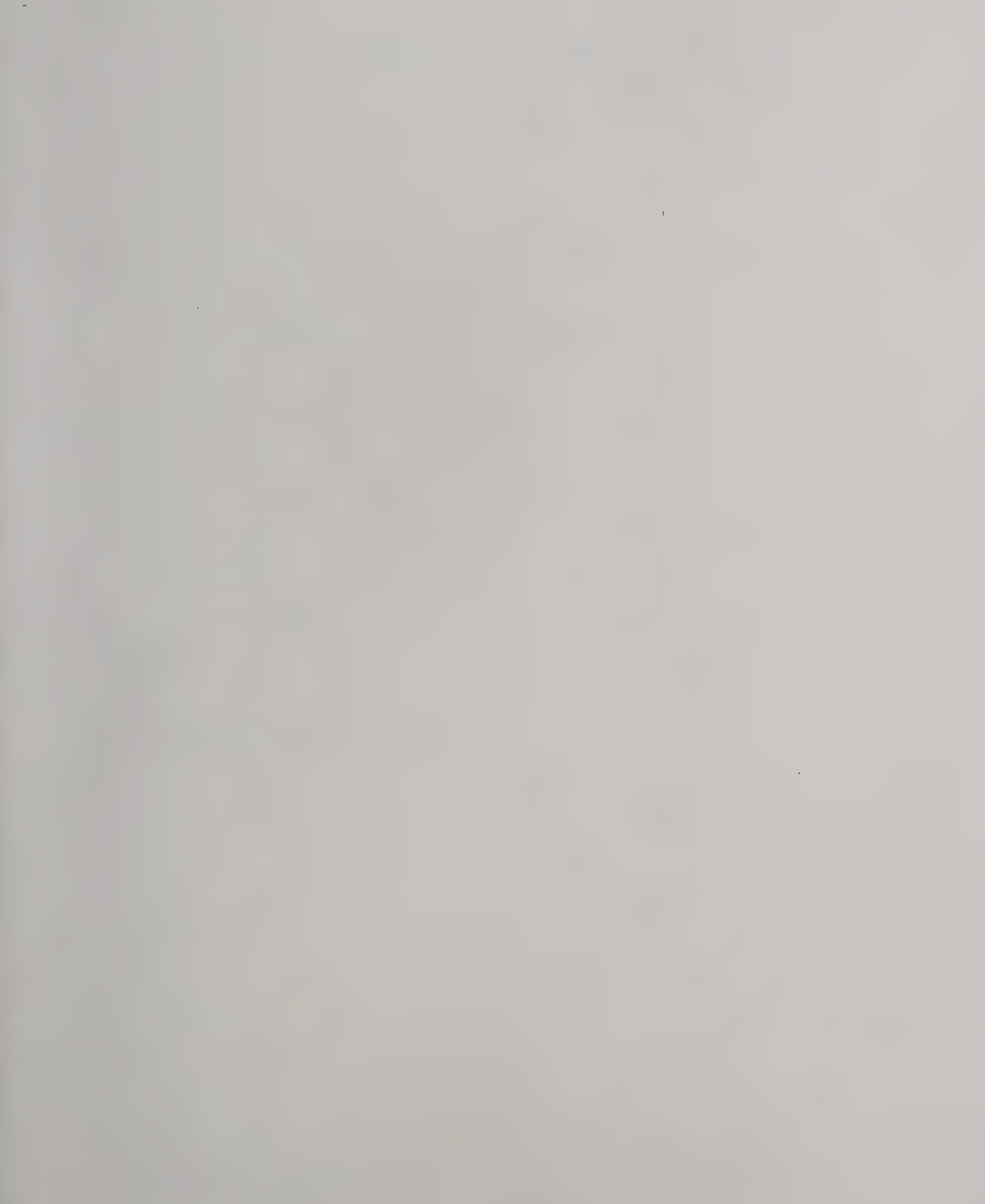


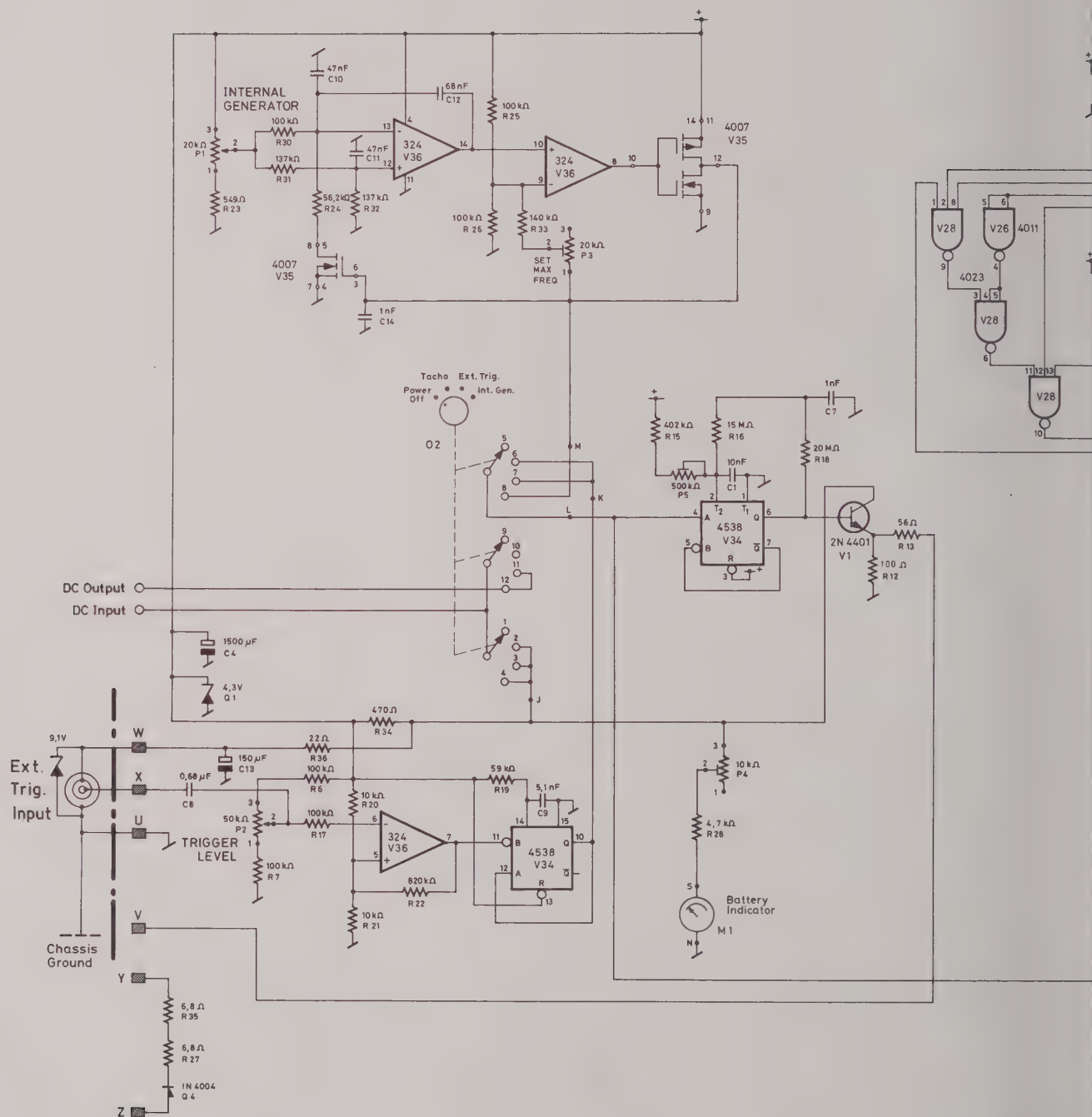
Viewed from the component side

PARTS LIST

C 1	Polystyrene	1%	10 nF/ 63 V	CT 1545	V 1	Silicon NPN	2N4401	VB 0518
C 2	Polycarbonate		2,2 μ F/ 63 V	CS 0349	V 13-16	BCD/7 Segm.Latch	MC14543	VD 2075
C 3	Polystyrene	1%	680 pF/125 V	CT 1134	V 21	Micrp. Phase-locked Loop	4046	VD 2071
C 4	Electrolytic		1500 μ F/ 10 V	CE 0216	V 22	8-Stage Synchr.D/C	40103	VD 2108
C 5	Ceramic	5%	33 pF/400 V	CK 1330	V 23	4 $\times$ Exclusive OR	4030	VD 2019
C 6	-	5%	10 pF/400 V	CK 1100	V 24	3 $\times$ 3 Input AND Gate	4073	VD 2092
C 7	-		1 nF/ 63 V	CK 3102	V 25	2 $\times$ BCD Counter/Divider	4518	VD 2036
C 8	Polycarbonate		0,68 μ F/ 63 V	CS 0348	V 26	4 $\times$ 2 Input NAND	4011	VD 2004
C 9	Polystyrene	1%	5,1 nF/ 63 V	CT 1179	V 27	2 $\times$ DCD Counter/Divider	4518	VD 2036
C 10,11	Ceramic		47 nF/ 16 V	CK 4471	V 28	3 $\times$ 3 Input NAND	4023	VD 2013
C 12	Polystyrene	1%	68 nF/ 63 V	CT 1578	V 33	14-Stage Counter	4060	VD 2064
C 13	Tantalum		150 μ F/ 16 V	CF 0029	V 34	2 $\times$ Prec. Monost. Mult.	4538	VD 2097
C 14	Ceramic		1 nF/ 63 V	CK 3102	V 35	2 $\times$ Compl. Pair Plus Inv.	4007	VD 2059
					V 36	Op. Amp.	LM324	VE 0074
M 1	Battery Indicator			IM 0011				
					X 1	X-tal		MB 0015
O 1	Switch, "Hz/r pm"			OE 0182				JJ 0068
O 2	- "Power Off"			OE 0181		Socket		VU 1001
						Display		XC 1706
						Printed Circuit Board		
P 1	"Internal Gen.", Multiturn		20 k Ω	PX 3202				
P 2	"Trigger Level", Cond. plast		50 k Ω	PD 3505				
P 3	Trimmer, Cermet		20 k Ω	PG 3211				
P 4	-		10 k Ω	PG 3122				
P 5	-		500 k Ω	PG 4511				
Q 1	Ze. ZF4,3		4,0-4,6 V/0,25 W	QV 1110				
Q 2,3	Si. 1N4148		75 V/75 mA	QV 0216				
Q 4	- 1N4004		400 V/1 A	QV 0237				
R 1	Carbon	1/4 W	5%	22 k Ω	RB 4220			
R 2	-	-	-	82 k Ω	RB 4820			
R 3	-	-	-	270 k Ω	RB 5270			
R 4	Metal	-	1%	20,0 k Ω	RF 4200			
R 5	-	-	-	100 k Ω	RF 5100			
R 6-8	Carbon	-	5%	100 k Ω	RB 5100			
R 9	-	-	10%	15 M Ω	RH 0023			
R 10,11	-	-	5%	22 k Ω	RB 4220			
R 12	-	-	-	100 Ω	RB 2100			
R 13	-	-	-	56 Ω	RB 1560			
R 14	-	-	-	22 k Ω	RB 4220			
R 15	Metal	-	1%	402 k Ω	RF 5402			
R 16	Carbon	-	10%	15 M Ω	RH 0023			
R 17	-	-	5%	100 k Ω	RB 5100			
R 18	-	-	-	20 M Ω	RH 0903			
R 19	Metal	-	1%	59,0 k Ω	RF 4590			
R 20,21	Carbon	-	5%	10 k Ω	RB 4100			
R 22	-	-	-	820 k Ω	RB 5820			
R 23	Metal	-	1%	549 Ω	RF 2549			
R 24	-	-	-	56,2 k Ω	RF 4562			
R 25,26	-	-	-	100 k Ω	RF 5100			
R 27	Wire	4 W	10%	6,8 Ω	RX 0305			
R 28	Carbon	1/4 W	5%	4,7 k Ω	RB 3470			
R 29	-	-	-	2,2 k Ω	RB 3220			
R 30	Metal	-	1%	100 k Ω	RF 5100			
R 31,32	-	-	-	137 k Ω	RF 5137			
R 33	-	-	-	140 k Ω	RF 5140			
R 34	Carbon	-	5%	470 Ω	RB 2470			
R 35	Wire	4 W	10%	6,8 Ω	RX 0305			
R 36	-	-	-	22 Ω	RX 0311			

CIRCUIT DIAGRAM

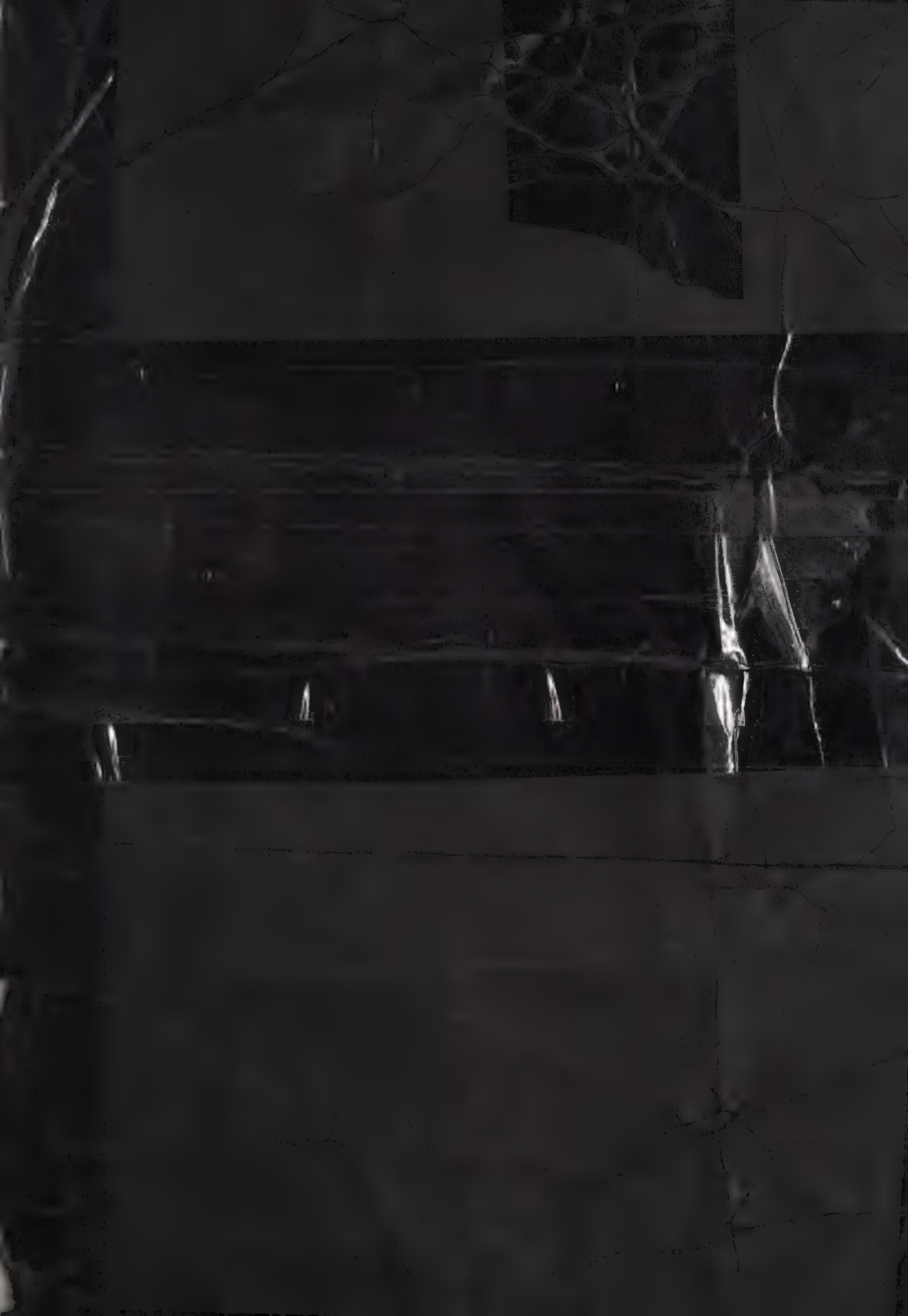


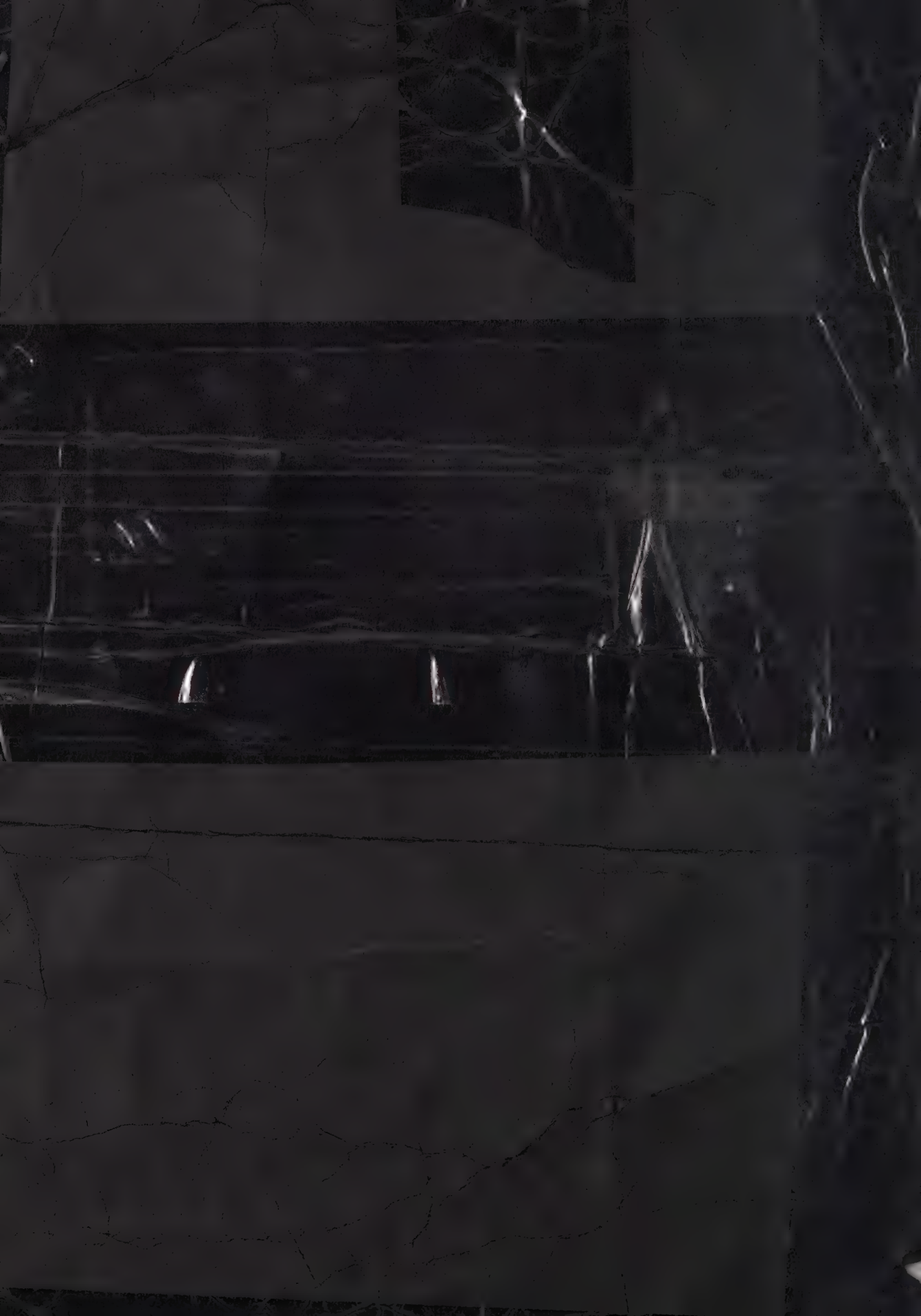


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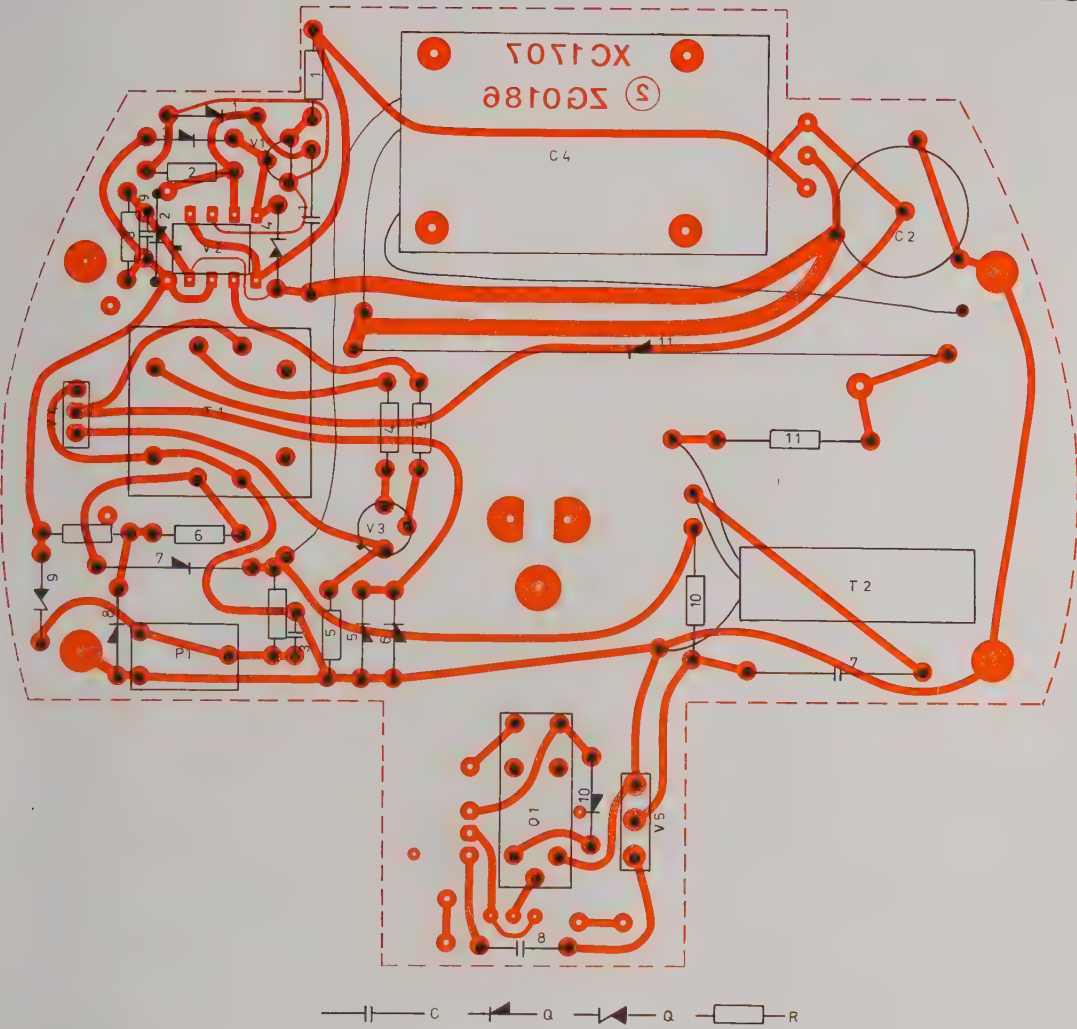


Bottom view



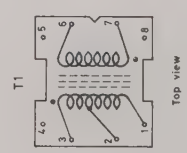
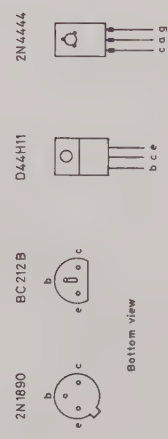
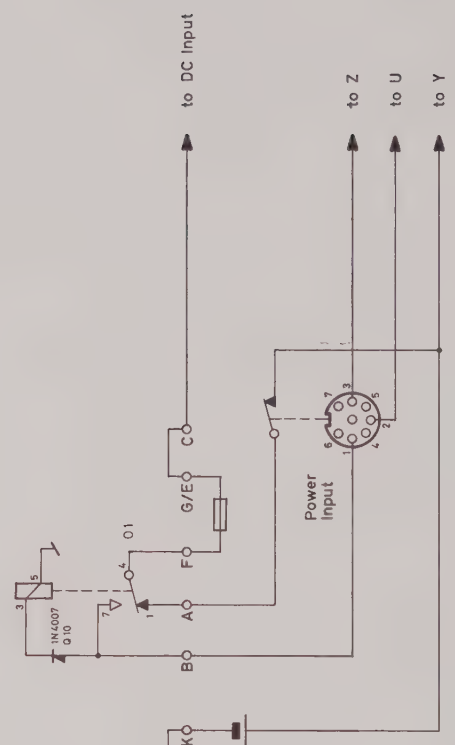
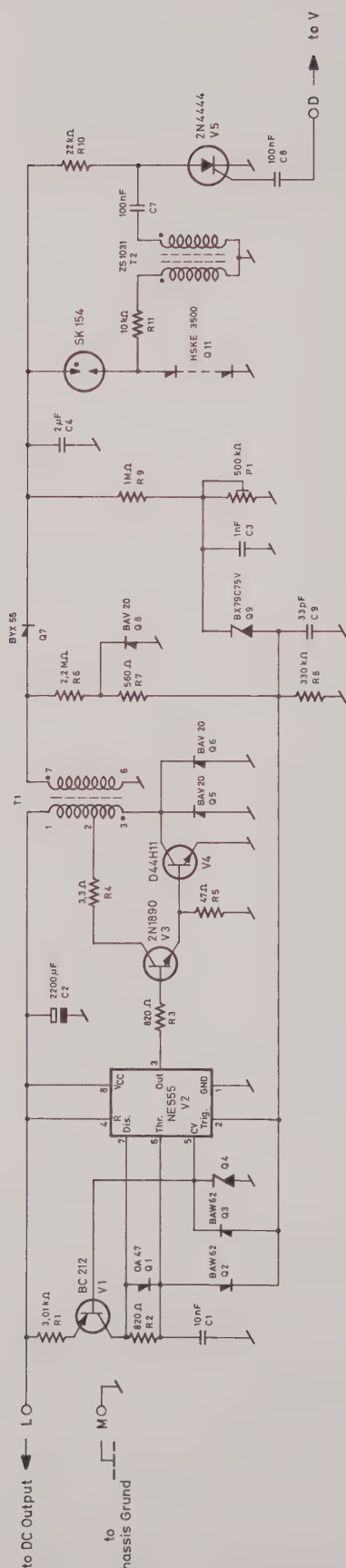


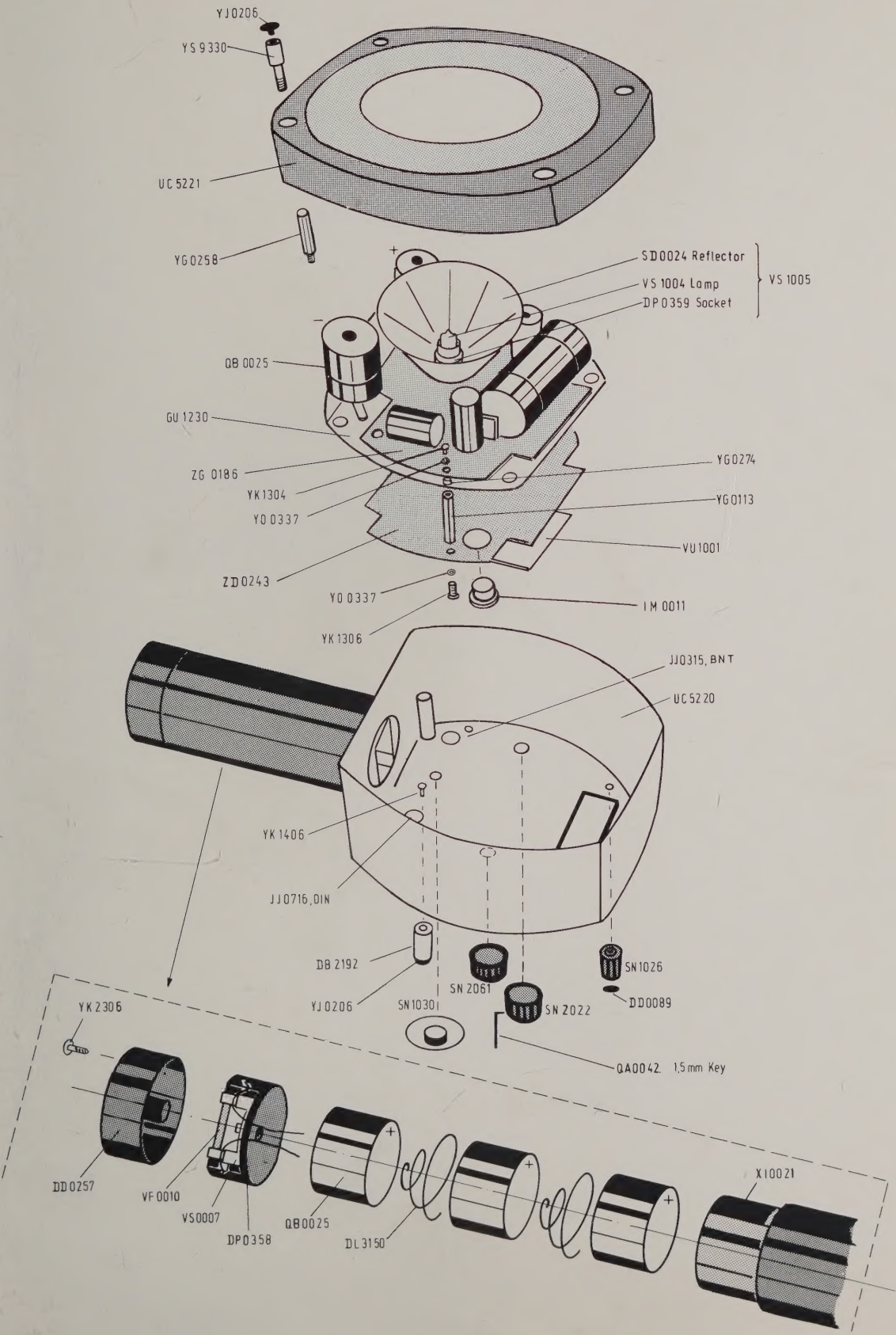




Viewed from the component side

C 1	Polystyrene	1%	10 nF/ 63 V	CT 1545	R 1	Metal	1/4 W	1%	3,01 kΩ	RF 3301
C 2	Electrolytic		2200 μF/ 16 V	CE 0344	R 2,3	Carbon	-	5%	820 Ω	RB 2820
C 3	Ceramic		1 nF/400 V	CK 3101	R 4	Metal	-	1%	3,30 Ω	RF 9233
C 4	Polypropylene		2 μF/450 V	CS 1005	R 5	Carbon	-	5%	47 Ω	RB 1470
C 7	Paper		100 nF/630 V	CP 0033	R 6	-	-	-	2,2 MΩ	RB 6220
C 8	Polyester		100 nF/100 V	CS 0436	R 7	-	-	-	560 kΩ	RB 5560
C 9	Ceramic		33 pF/400 V	CK 1330	R 8	-	-	-	330 kΩ	RB 5330
					R 9	-	-	-	1 MΩ	RB 6100
O 1	Relay			OC 0058	R 10	-	-	-	22 kΩ	RB 4220
					R 11	Wire	2 W	-	10 kΩ	RO 0707
P 1	Cermet		500 kΩ	PG 4513	T 1	Coil				LB 0946
					T 2	High Voltage Transformer				TH 0011
Q 1	Ge.	OA47	25 V 110 mA	QV 0094						
Q 2,3	Si.	BAW62	150 V/0,1 A	QV 0256	V 1	Silicon	PNP	BC212		VB 0049
Q 4	Ze.	LVA47A	4,5-4,9 V/0,25 W	QV 1359	V 2	Timer		NE555		VD 0062
Q 5,6	Si.	BAV20	150 V/200 mA	QV 0249	V 3	Silicon	NPN	2N1890		VB 0526
Q 7	-	BYX55-600	500 V/5 A	QV 0257	V 4	-	-	D44H11		VB 0597
Q 8	-	BAV 20	150 V/200 mA	QV 0249	V 5	SCR		2N4444		VB 5107
Q 9	Ze.	BX79C75V	70-79 V/0,4 W	QV 1386						
Q 10	Si.	1N4007	1000 V/1 A	OV 0248						
Q 11	-	HSKE3500/1550-0,3	8000 V/1 A	QV 0047						







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